

REMARKS

Claims 1-4 and 6-10 are pending in this application. By this Amendment, independent claims 1, 2 and 6 are amended for clarity and to even further distinguish over the applied references, claim 9 is amended to correct an informality, claims 4 and 8 are amended for consistency and independent claim 10 is added. Support for added claim 10 can be found, for example, on page 5, lines 26-28 and on page 6, lines 15 and 16 of the specification. No new matter is added. Reconsideration of this application in view of the above amendments and the following remarks is respectfully requested.

The courtesies extended to Applicants' representative by Examiners Slifka and Mayes at the interview held September 24, 2009, are appreciated. The reasons presented at the interview as warranting favorable action are incorporated into the remarks below, which constitute Applicants' record of the interview.

The Office Action objects to claims 1 and 9. The objection is obviated by the above amendments. Thus, it is respectfully requested that the objection be withdrawn.

The Office Action rejects claims 1-4 and 9 under 35 U.S.C. §112, second paragraph. The rejection is respectfully traversed.

As agreed during the interview, one of ordinary skill in the art would understand the meaning of the expression "three phase bridge type converter" in the context of DC-DC converters. Thus, it is respectfully requested that the rejection be withdrawn.

The Office Action rejects claims 1-4 and 6-9 under 35 U.S.C. §103(a) over Sugiura et al. (Sugiura), U.S. Patent Application Publication No. 2002/0038732 A1 in view of Tsuchiya, JP-2003-235252. The rejection is respectfully traversed.

The combination of Sugiura and Tsuchiya does not disclose, and would not have rendered obvious, a hybrid fuel cell system having a voltage converter that is a three phase bridge type converter, the converter comprising a plurality of phases, the system comprising a

controller that changes a number of phases of operation of the voltage converter in accordance with a value equivalent to power passing through the voltage converter such that, by changing the number of phases of operation, the controller switches the voltage converter between a single phase drive mode and a multiple phase drive mode, as recited in independent claim 1 and similarly recited in independent claims 2 and 6.

The Office Action acknowledges that Sugiura does not disclose a converter that comprises a plurality of phases, but cites Tsuchiya as allegedly overcoming the deficiency. Tsuchiya discloses a power circuit having a master slave type DC-DC converter (see Abstract). The master slave type DC-DC converter includes a master DC-DC converter and a slave DC-DC converter that are controlled by a controller on the basis of the requested output voltage (see Abstract). That is, the slave DC-DC converters are added to the master DC-DC converter when the requested output voltage exceeds the capacity of the master DC-DC converter (see paragraph [0027]). However, as discussed during the interview, Tsuchiya does not disclose using a converter having a plurality of phases. Further, Tsuchiya does not disclose a three phase bridge type converter.

The addition of DC-DC converters as disclosed in Tsuchiya is like adding dry cell batteries in a parallel manner to a single dry cell battery, because they all provide direct current. By contrast, adding or changing the phases in a single DC-DC converter is far more complicated than the addition of DC-DC converters. Each of the multiple phases in a converter handles an alternating current and has a different phase shift from each other. Therefore, the changing of the number of phases in a single DC-DC converter is technically different than merely adding DC-DC converters.

Further, adding a slave DC-DC converter to the master DC-DC converter in Tsuchiya does not mean that the phase is changed to a different phase (i.e., it does not mean that there are a plurality of phases). The master DC-DC converter and the slave DC-DC converters in

Tsuchiya must each be driven at some phase. However, Tsuchiya does not disclose that the phase at which the master DC-DC converter and the slave DC-DC converters are driven is different. As such, the phases in the converters could overlap or be the same, which would result in energy inefficiencies.

Furthermore, Tsuchiya does not disclose that controller 4 switches the master DC-DC converter and slave DC-DC converters in a synchronized manner or that the timing of the internal switching of the master DC-DC converter and slave DC-DC converters is linked. Initiation of the drive of a phase or change of a phase requires specific control on the switching elements in a converter so as to adjust the switching timings correctly. As such, adding a slave DC-DC converter to the master DC-DC converter in Tsuchiya does not necessarily mean that the phase is different when one or more slave DC-DC converter is added or that there is more than one phase. As such, a person of ordinary skill in the art would not consider the power circuit of Tsuchiya as being equivalent to having a DC-DC converter that changes between a single phase drive and a multiple phase drive.

Therefore, the combination of Sugiura and Tsuchiya does not disclose, and would not have rendered obvious, a hybrid fuel cell system having a voltage converter that is a three phase bridge type converter, the converter comprising a plurality of phases, the system comprising a controller that changes a number of phases of operation of the voltage converter in accordance with a value equivalent to power passing through the voltage converter such that, by changing the number of phases of operation, the controller switches the voltage converter between a single phase drive mode and a multiple phase drive mode, as recited in independent claim 1 and similarly recited in independent claims 2 and 6.

Therefore, independent claims 1, 2 and 6 and dependent claims 3, 4 and 7-9 are patentable over the combination of Sugiura and Tsuchiya. Thus, it is respectfully requested that the rejection be withdrawn.

Added claim 10 also is patentable over the applied references for the same reasons as discussed above with respect to independent claims 1, 2 and 6. Specifically, Tsuchiya does not disclose that the master DC-DC converter and the slave DC-DC converters have different phase shifts with respect to each other. Further, Tsuchiya does not disclose that the controller 4 switches the master DC-DC converter and slave DC-DC converters in a synchronized manner.

In view of the foregoing, it is respectfully submitted that this application is in condition for allowance. Favorable reconsideration and prompt allowance are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number set forth below.

Respectfully submitted,

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JAO:JTL/emd

Attachment:
Amendment Transmittal

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